## WHAT IS CLAIMED IS:

- 1. A process for preparing a thermosensitive polymer comprising polymerizing a microemulsion comprising a first monomer that is capable of forming a thermosensitive polymer and a polymerizable surfactant.
- 2. The process of claim 1 wherein the first monomer is an acrylamide derivative.
- 3. The process of claim 2 wherein the first monomer is an alkylated acrylamide.
- 4. The process of claim 3 wherein the first monomer is N-isopropylacrylamide.
- 5. The process of claim 4 wherein the polymerizable surfactant is  $\omega$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methacrylate or fluronic68-diacrylate.
- 6. The process of claim 5 wherein the microemulsion comprises a comonomer.
- 7. The process of claim 6 wherein the microemulsion comprises methyl methacrylate or 2-hydroxyethyl methacrylate.
- 8. The process of claim 7, wherein the polymerizable surfactant is  $\omega$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methoxylate and the microemulsion further comprises a chemical cross-linker.
- 9. The process of claim 8, wherein the cross-linker is EGDMA.
- 10. The process of claim 9, wherein the microemulsion further comprises a photo-initiator.
- 11. The process of claim 10, wherein the photo-initiator is 2,2-dimethoxy-2-phenylacetophenone.
- 12. The process of claim 11, wherein the polymerizing comprises subjecting the microemulsion to ultraviolet radiation.

- 13. The process of claim 12 comprising the step of preparing a layer of microemulsion of a desired thickness prior to polymerization.
- 14. The process of claim 13, wherein the microemulsion comprises about 20 % (w/w) N-isopropylacrylamide, about 10% (w/w) methyl methacrylate, about 10% (w/w) 2-hydroxyethyl methacrylate, about 35% (w/w)  $\omega$ -methoxy poly(ethylene oxide)40 undecyl  $\alpha$ -methacrylate, about 23% (w/w) water and about 2% ethylene glycol dimethacrylate.
- 15. The process of claim 13, wherein the microemulsion comprises about 10 % (w/w) N-isopropylacrylamide, about 10% (w/w) methyl methacrylate, about 20 % (w/w) 2-hydroxyethyl methacrylate, about 35 % (w/w)  $\alpha$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methacrylate, about 23% (w/w) water and about 2% ethylene glycol dimethacrylate.
- 16. The process of claim 13, wherein the microemulsion comprises about 7.5 % (w/w) N-isopropylacrylamide, about 7.5 % (w/w) methyl methacrylate, about 15 % (w/w) 2-hydroxyethyl methacrylate, about 35 % (w/w)  $\omega$ -methoxy poly(ethylene oxide) $\omega$ 0 undecyl  $\alpha$ -methacrylate, about 33% (w/w) water and about 2% ethylene glycol dimethacrylate.
- 17. The process of claim 13, wherein the microemulsion comprises about 10 % (w/w) N-isopropylacrylamide, about 20 % (w/w) methyl methacrylate, about 10 % (w/w) 2-hydroxyethyl methacrylate, about 35 % (w/w)  $\omega$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methacrylate, about 23% (w/w) water and about 2% ethylene glycol dimethacrylate.
- 18. The process of claim 13, wherein the microemulsion comprises about 25 % (w/w) N-isopropylacrylamide, about 10 % (w/w) methyl methacrylate, about 5 % (w/w) 2-hydroxyethyl methacrylate, about 35 % (w/w)  $\omega$ -methoxy poly(ethylene oxide) $\omega$ 40 undecyl  $\omega$ 40 methacrylate, about 23% (w/w) water and about 2% ethylene glycol dimethacrylate.
- 19. The process of claim 13, wherein the microemulsion comprises about 30 % (w/w) N-isopropylacrylamide, about 10 % (w/w) 2-hydroxyethyl methacrylate, about 35 % (w/w) ω-methoxy poly(ethylene oxide)40 undecyl α-methacrylate, about 23% (w/w)

water and about 2% ethylene glycol dimethacrylate.

- 20. The process of claim 13, wherein the microemulsion comprises about 10 % (w/w) N-isopropylacrylamide, about 25 % (w/w) methyl methacrylate, about 5 % (w/w) 2-hydroxyethyl methacrylate, about 35 % (w/w)  $\omega$ -methoxy poly(ethylene oxide)  $\omega$  undecyl  $\alpha$ -methacrylate, about 23% (w/w) water and about 2% ethylene glycol dimethacrylate.
- 21. A method of dressing and undressing a wound comprising:

applying a thermosensitive polymer to a wound;

immediately prior to removing the polymer from the wound, reducing the temperature of thermosensitive polymer to facilitate removal of the polymer, and

removing the polymer from the wound.

- 22. A method of delivering a therapeutic agent to a wound comprising: incorporating a therapeutic agent into a thermosensitive nanoporous polymer, and applying the thermosensitive nanoporous polymer to the wound.
- 23. The method of claim 22, wherein the therapeutic agent is a drug, an antibiotic, an anti-inflammatory agent, a clotting factor, a hormone, a nucleic acid, a peptide, a cellular factor, or a ligand for a cell surface receptor.
- 24. The method of claim 22, wherein the therapeutic agent is a drug or an antibiotic.
- 25. The method of claim 22, wherein the therapeutic agent is a wound healing accelerator.
- 26. A method of delivering a cell to a graft site comprising:
  culturing the cell on a thermosensitive nanoporous polymer, and

placing the polymer comprising the cell onto the graft site.

27. The method of claim 26, further comprising:

reducing the temperature of the thermosensitive nanoporous polymer to facilitate removal of the polymer, and

removing the polymer from the graft site.

- 28. The method of claim 27, wherein the step of reducing the temperature is performed after placing the thermosensitive nanoporous polymer carrying the cell onto the graft site.
- 29. A thermosensitive nanoporous polymer when prepared by the process of any one of claims 1 to 20.
- 30. A thermosensitive nanoporous membrane when prepared by the process of claim 13.
- 31. A thermosensitive polymer which is nanoporous.
- 32. The thermosensitive nanoporous polymer of claim 31 having a decomposition temperature of at least about 300°C.
- 33. The thermosensitive nanoporous polymer of claim 32 having a water vapour transmission rate of about 500 to about 2000 g/m²/day.
- 34. The thermosensitive nanoporous polymer of claim 33 having a tensile strength of about 4 to about 20 MPa.
- 35. The thermosensitive polymer of claim 34 formed from a microemulsion comprising a first monomer capable of forming a thermosensitive polymer and a polymerizable surfactant.
- 36. The thermosensitive nanoporous polymer of claim 35 wherein the first monomer

is N-isopropylacrylamide.

- 37. The thermosensitive nanoporous polymer of claim 36 wherein the polymerizable surfactant is <u>o-methoxy poly(ethylene oxide)</u> undecyl or methoxy late or fluronic68-diacrylate.
- 38. The thermosensitive nanoporous polymer of claim 37, wherein the microemulsion comprises N-isopropylacrylamide, methyl methacrylate, 2-hydroxyethyl methacrylate,  $\alpha$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methacrylate, water and ethylene glycol dimethacrylate in a ratio of approximately 20:10:35:23:2.
- 39. The thermosensitive nanoporous polymer of claim 37, wherein the microemulsion comprises N-isopropylacrylamide, methyl methacrylate, 2-hydroxyethyl methacrylate, ω-methoxy poly(ethylene oxide)<sub>40</sub> undecyl α-methacrylate, water and ethylene glycol dimethacrylate in a ratio of approximately 10:10:20:35:23:2.
- 40. The thermosensitive nanoporous polymer of claim 37, wherein the microemulsion comprises N-isopropylacrylamide, methyl methacrylate, 2-hydroxyethyl methacrylate, ω-methoxy poly(ethylene oxide)<sub>40</sub> undecyl α-methacrylate, water and ethylene glycol dimethacrylate in a ratio of approximately 7.5:7.5:15:35:33:2.
- 41. The thermosensitive nanoporous polymer of claim 37, wherein the microemulsion comprises N-isopropylacrylamide, methyl methacrylate, 2-hydroxyethyl methacrylate,  $\omega$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methacrylate, water and ethylene glycol dimethacrylate in a ratio of approximately 10:20:10:35:23:2.
- 42. The thermosensitive nanoporous polymer of claim 37, wherein the microemulsion comprises N-isopropylacrylamide, methyl methacrylate, 2-hydroxyethyl methacrylate,  $\omega$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methacrylate, water and ethylene glycol dimethacrylate in a ratio of approximately 25:10:5:35:23:2.
- 43. The thermosensitive nanoporous polymer of claim 37, wherein the microemulsion

comprises N-isopropylacrylamide, 2-hydroxyethyl methacrylate,  $\omega$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methacrylate, water and ethylene glycol dimethacrylate in a ratio of approximately 30:10:35:23:2.

- 44. The thermosensitive nanoporous polymer of claim 37, wherein the microemulsion comprises N-isopropylacrylamide, methyl methacrylate, 2-hydroxyethyl methacrylate,  $\omega$ -methoxy poly(ethylene oxide)<sub>40</sub> undecyl  $\alpha$ -methacrylate, water and ethylene glycol dimethacrylate in a ratio of approximately 10:25:5:35:23:2.
- 45. The method of claim 28 wherein the graft site is the round window membrane of the ear of a subject or comea.